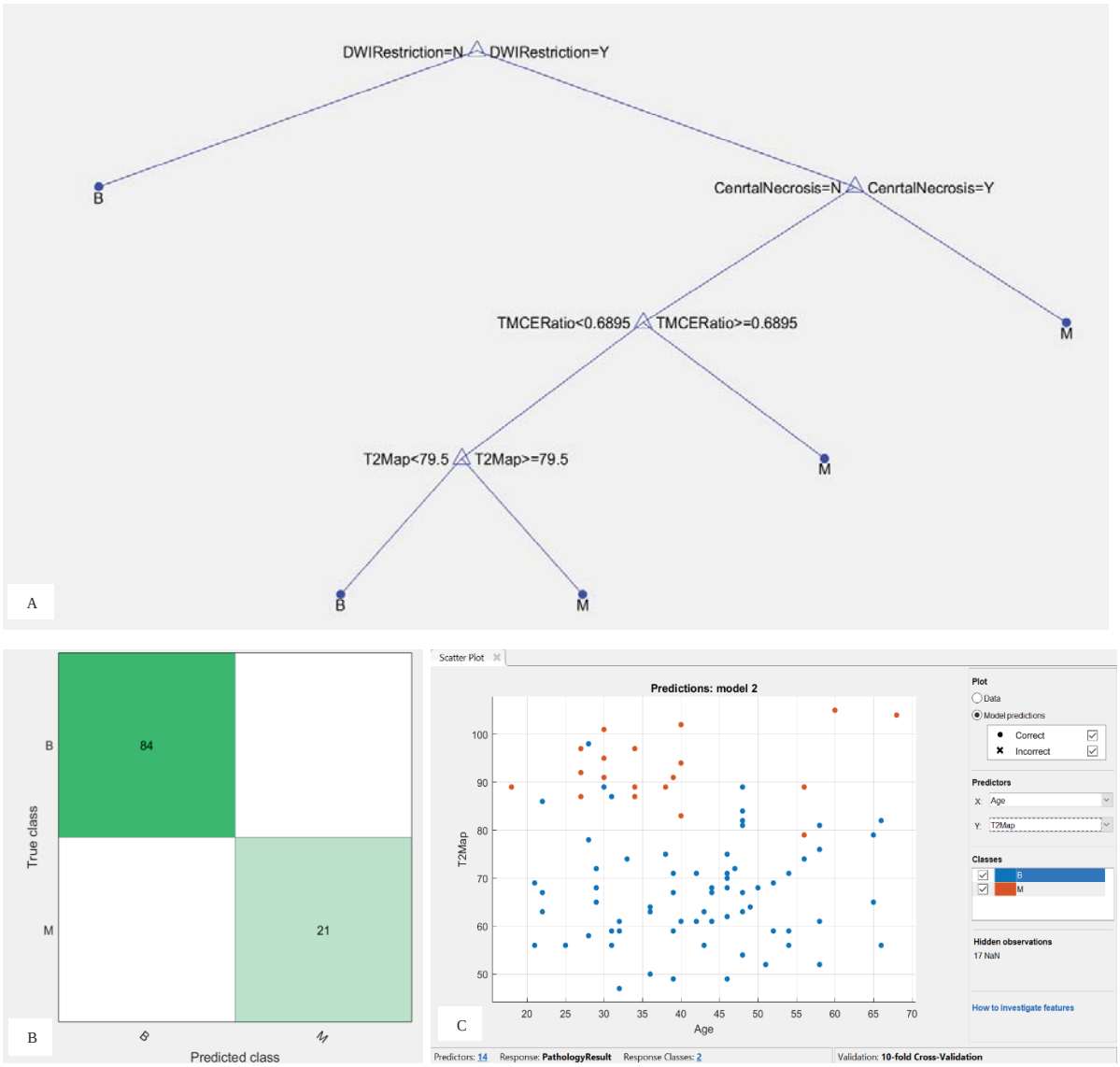

Figure 2. A, complex decision tree using four parameters of DWI restriction, central necrosis, T2 map, and TMCE ratio; B, confusion matrix for the number of lesions on true and false predicted classes; C, scatter-plot for distribution of lesions based on the complex model. B, Benign; M, malignant; Y, yes; N, no.

Keywords: Diagnostic Algorithms; Machine Learning; Leiomyosarcoma; Decision Trees; Uterine Neoplasms

• 10.5812/IRANJRADIOL.99155

Evaluation of IoT Capability in Detecting Kidney Malformations on Ultrasound Imaging System

Ali Hajipourtalebi[1]; Monireh Tahvildarzadeh[2]; Soheila Vashghani Farahani[3,*]; Mehrangiz Ghabimi[4]; Sadegh Taheri[1]

[1] *Student Research Committee, Faculty of Nursing, AJA University of Medical Sciences, Tehran, Iran*
[2] *Health Information Technology Group, Lorestan University of Medical Sciences, Khoramabad, Iran*
[3] *Student Research Committee, Lorestan University of Medical Sciences, Khoramabad, Iran*
[4] *Zahedan University of Medical Sciences, Zahedan, Iran*

**Corresponding author: B.Sc. Student of Health Information Technology, Student Research Committee, Lorestan University of Medical Sciences, Khoramabad, Iran. Email: savasheghanifarahani@gmail.com*

Abstract

Background: Remote radiology is used in the remote areas today to diagnose scanned ultrasound data due to the lack of trained radiologists. The availability of online radiography experts and the availability of portable ultrasound communication facilities are some of the issues in remote radiology for the use of ultrasound scanning in telehealth.

Objectives: The purpose of the present study was to investigate the ability of IoT to detect computer abnormalities of kidneys on ultrasound imaging.

Methods: The study was conducted systematically by searching the Scopus, Science Direct, PubMed, and Google Scholar search engine databases using the PRISMA flow diagram to select articles. The English language input and the time range of 2013 to 2018 were used for the search. There were about 123 articles, 42 of which were included in the study. Then, the qualitative evaluation of articles was done based on the 12-question CASP diagnostic test study checklist and finally, 15 articles related to the study were selected.

Results: The results of studies showed that IoT was more acceptable and satisfactory than other imaging modalities and had a significant role in the diagnosis of kidney disease, in terms of both cost and time.

Conclusion: The results of the study showed that in the absence of a radiologist in the therapeutic environment or the patient's inability to visit the hospital or clinic, using IoT is the best way to solve the mentioned problems.

Keywords: IoT; Kidney Disease; Ultrasound Imaging

• 10.5812/IRANJRADIOL.99156

Medical Image Fusion Based on Deep Convolutional Neural Network

Abolfazl Sedighi[1,*]; Alireza Nikravanshalmani[1]; Madjid Khalilian[1]

[1] *Karaj Branch, Islamic Azad University, Karaj, Iran*

**Corresponding author: Karaj Branch, Islamic Azad University, Karaj, Iran. Email: a.sedighi.ai@gmail.com*

Abstract

Background: Medical image fusion plays an important role in helping doctors for effective diagnosis and treatment.

Objectives: The purpose of image fusion is to combine information from various different medical modalities into a single image with preserving salient features and details of the source image.

Methods: In this article, we present an approach for fusion MRI and CT images based on a deep convolutional neural network with four layers that was trained with medical images. In the beginning, images were decomposed to high and low frequencies by applied nonsubsampled shearlet transform (NSST). Then, for high-frequency sub-band, we used deep convolution neural networks for extracting feature maps. Low-frequency sub-band became fusion using the law of local energy fusion and in the end, the fused images were reconstructed by reverse NSST.

Results: Experimental results indicated that the proposed scheme had better functionality in terms of image preservation, visual quality, and subjective and objective assessment.

Conclusion: In this work, a medical image fusion method based on deep convolutional neural networks was proposed. The main novelty of this approach was the use of a deep convolutional neural network with four layers that was trained to extract source image features. To achieve good results, we used the nonsubsampled shearlet transform technique for multi-scale decomposition. Based on the experimental results, the proposed method achieved the best fusion performance.

• 10.5812/IRANJRADIOL.99157

Classification of Brain MRI for Alzheimer's Disease Detection Based on Ensemble Machine Learning

Soheil Ahmadzade Irandoost[1,*]; Fatemeh Asadi[2]

[1] *Department of Medical Physics and Medical Engineering, Medical School, Tehran University of Medical Science, Tehran, Iran*

[2] *Department of Medical Physics and Biomedical Engineering, Medicine College, Tehran University of Medical Science, Tehran, Iran*

**Corresponding author: Department of Medical Physics and Medical Engineering, Medical School, Tehran University of Medical Science, Tehran, Iran. Email: s-ahmadzadei@razi.tums.ac.ir*

Abstract

Background: Machine learning is now a powerful tool to help improve medical disorders diagnosis. One of its critical applications is the classification or clustering of neurodegenerative disease by pattern recognition methods based on biomedical signals and medical images. Early detection of these diseases is always useful and vital. In this study, we focused on Alzheimer's disease (AD) as a